

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An active matrix liquid crystal display device comprising:

~~a substrate having an insulating surface;~~

an underlying insulating film formed on said substrate;

a pixel circuit and a driving circuit formed on said ~~insulating surface~~ underlying insulating film;

at least one thin film transistor formed in said pixel circuit, said thin film transistor having a semiconductor layer comprising source, drain and channel regions;

an insulating film comprising an inorganic material formed on said thin film transistor;

an organic resin film provided over said insulating film; and

a pixel electrode formed over said organic resin film and connected to said thin film transistor through an opening provided in said organic resin film,

wherein said semiconductor layer exhibits a peak of Raman spectra, displaced from a peak of single crystalline silicon to the lower frequency direction,

wherein said ~~semiconductor layer has a semi-amorphous structure in which Si-Si bonds anchor clusters~~ underlying insulating film contains halogen.

2. (Original) A device according to claim 1 wherein said pixel electrode is a transparent conductive film.

3. (Original) A device according to claim 1 wherein said inorganic material comprises silicon oxide.

4. (Previously Presented) A device according to claim 1 wherein said channel region comprises a material selected from the group consisting of silicon, germanium and a combination thereof.

5. (Currently Amended) A device according to claim 1 wherein said ~~interlayer~~ insulating film is 0.2 to 0.6 μm thick.

6. (Original) A device according to claim 1 consisting of 640 x 480 pixels arranged in a matrix form.

7. (Original) A device according to claim 1 consisting of 1260 x 960 pixels arranged in a matrix form.

8. (Currently Amended) A device according to claim 1 further comprising a conductive film formed on said ~~interlayer~~ insulating film and electrically connected to said thin film transistor through a contact hole formed in said ~~interlayer~~ insulating film.

9. (Original) A device according to claim 8 wherein said pixel electrode is connected to said thin film transistor via said conductive film.

10. (Currently Amended) An active matrix liquid crystal display device comprising:

a substrate ~~having an insulating surface~~;

an underlying insulating film formed on said substrate;

a pixel circuit and a driving circuit formed on said ~~insulating surface~~ underlying insulating film;

at least one thin film transistor formed in said pixel circuit, said thin film transistor having a semiconductor layer comprising source, drain and channel regions;

an insulating film comprising an inorganic material formed on said thin film transistor;

an organic resin film provided over said insulating film; and

a pixel electrode formed over said organic resin film and connected to said thin film transistor through an opening provided in said organic resin film,

wherein said semiconductor layer exhibits a peak of Raman spectra, displaced from 522 cm^{-1} to the lower frequency direction, and

wherein said ~~semiconductor layer has a semi-amorphous structure in which Si-Si bonds anchor clusters~~ underlying insulating film contains halogen.

11. (Original) A device according to claim 10 wherein said pixel electrode is a transparent conductive film.

12. (Original) A device according to claim 10 wherein said inorganic material comprises silicon oxide.

13. (Original) A device according to claim 10 wherein said channel region comprises a material selected from the group consisting of silicon, germanium and a combination thereof.

14. (Currently Amended) A device according to claim 10 wherein said ~~interlayer~~ insulating film is 0.2 to 0.6 μm thick.

15. (Original) A device according to claim 10 consisting of 640 x 480 pixels arranged in a matrix form.

16. (Original) A device according to claim 10 consisting of 1260 x 960 pixels arranged in a matrix form.

17. (Currently Amended) A device according to claim 10 further comprising a conductive film formed on said ~~interlayer~~ insulating film and electrically connected to said thin film transistor through a contact hole formed in said ~~interlayer~~ insulating film.

18. (Original) A device according to claim 17 wherein said pixel electrode is connected to said thin film transistor via said conductive film.

19. (Currently Amended) An active matrix liquid crystal display comprising:

a substrate ~~having an insulating surface~~;

an underlying insulating film formed on said substrate;

a pixel circuit and a driving circuit formed on said ~~insulating surface~~ underlying insulating film;

at least one thin film transistor formed in said pixel circuit, said thin film transistor comprising:

a semiconductor layer having source, drain and channel regions;

a gate insulating layer adjacent to said channel region; and

a gate electrode adjacent to said channel region;

an insulating film comprising an inorganic material formed on said thin film transistor; and

an organic resin film provided over said insulating film;

wherein said semiconductor layer exhibits a peak of Raman spectra, displaced from a peak of single crystalline silicon to the lower frequency direction,

wherein said ~~semiconductor layer has a semi-amorphous structure in which Si-Si bonds anchor clusters~~ underlying insulating film contains halogen.

20. (Original) A device according to claim 19 further comprising a pixel electrode formed over said organic resin film and connected to said thin film transistor through an opening provided in said organic resin film.

21. (Original) A device according to claim 20 wherein said pixel electrode is a transparent conductive film.

22. (Original) A device according to claim 19 wherein said inorganic material comprises silicon oxide.

23. (Original) A device according to claim 19 wherein said channel region comprises a material selected from the group consisting of silicon, germanium and a combination thereof.

24. (Original) A device according to claim 19 wherein said gate insulating film is 500Å to 2000Å thick.

25. (Currently Amended) A device according to claim 19 wherein said interlayer insulating film is 0.2 to 0.6 μm thick.

26. (Original) A device according to claim 19 consisting of 640 x 480 pixels arranged in a matrix form.

27. (Original) A device according to claim 19 consisting of 1260 x 960 pixels arranged in a matrix form.

28. (Previously Presented) A device according to claim 19 wherein said semiconductor layer has an electron mobility of 15 to 300 cm²/Vsec.

29. (Previously Presented) A device according to claim 19 wherein said semiconductor layer has a hole mobility of 10 to 200 cm²/Vsec.

30. (Currently Amended) A device according to claim 19 further comprising a conductive film formed on said ~~interlayer~~ insulating film and electrically connected to said thin film transistor through a contact hole formed in said ~~interlayer~~ insulating film.

31. (Original) A device according to claim 30 wherein said pixel electrode is connected to said thin film transistor via said conductive film.

32. (Currently Amended) An active matrix liquid crystal display device comprising:

a substrate ~~having an insulating surface~~;

an underlying insulating film formed on said substrate;

a pixel circuit and a driving circuit formed on said ~~insulating surface~~ underlying insulating film;

at least one thin film transistor formed in said pixel circuit, said thin film transistor comprising:

a semiconductor layer having source, drain and channel regions;

a gate insulating layer adjacent to said channel region;

an insulating film comprising an inorganic material formed on said thin film transistor; and

an organic resin film provided over said thin film transistor and said insulating film;

wherein said semiconductor layer comprises silicon and exhibits a peak of Raman spectra, displaced from 522 cm⁻¹ to the lower frequency direction, and

wherein said ~~semiconductor layer has a semi-amorphous structure in which Si-Si bonds anchor clusters~~ underlying insulating film contains halogen.

33. (Original) A device according to claim 32 further comprising a pixel electrode formed over said organic resin film and connected to said thin film transistor through an opening provided in said organic resin film.

34. (Original) A device according to claim 33 wherein said pixel electrode is a transparent conductive film.

35. (Currently Amended) A device according to claim 32 wherein said ~~inorganic~~ material comprises silicon oxide.

36. (Original) A device according to claim 32 wherein said channel region comprises a material selected from the group consisting of silicon, germanium and a combination thereof.

37. (Original) A device according to claim 32 wherein said gate insulating film is 500Å to 2000Å thick.

38. (Currently Amended) A device according to claim 32 wherein said ~~interlayer~~ insulating film is 0.2 to 0.6 µm thick.

39. (Original) A device according to claim 32 consisting of 640 x 480 pixels arranged in a matrix form.

40. (Original) A device according to claim 32 consisting of 1260 x 960 pixels arranged in a matrix form.

41. (Previously Presented) A device according to claim 32 wherein said semiconductor layer has an electron mobility of 15 to 300cm²/Vsec.

42. (Previously Presented) A device according to claim 32 wherein said semiconductor layer has a hole mobility of 10 to 200 cm²/Vsec.

43. (Currently Amended) A device according to claim 32 further comprising a conductive film formed on said ~~interlayer~~ insulating film and electrically connected to said thin film transistor through a contact hole formed in said ~~interlayer~~ insulating film.

44. (Original) A device according to claim 43 wherein said pixel electrode is connected to said thin film transistor via said conductive film.

45. (Currently Amended) An active matrix liquid crystal display device comprising:

a substrate ~~having an insulating surface;~~

~~a pixel circuit and a driving circuit formed on said insulating surface;~~

an underlying insulating film formed on said substrate;

at least an n-channel thin film transistor and at least a p-channel thin film transistor both formed ~~in said driver circuit~~ on said underlying insulating film, each of said n-channel and p-channel thin film transistors comprising:

a semiconductor layer having source, drain and channel regions;

a gate insulating layer adjacent to said channel region; and

a gate electrode adjacent to said channel region;

an insulating film comprising an inorganic material formed ~~on said thin film transistor~~ over said gate electrode; and

an organic resin film provided over said insulating film;

wherein said semiconductor layer exhibits a peak of Raman spectra, displaced from a peak of single crystalline silicon to the lower frequency direction, and

wherein said ~~semiconductor layer has a semi-amorphous structure in which Si-Si bonds anchor clusters~~ underlying insulating film contains halogen.

46. (Original) A device according to claim 45 further comprising a pixel electrode formed over said organic resin film and connected to said thin film transistor through an opening provided in said organic resin film.

47. (Original) A device according to claim 46 wherein said pixel electrode is a transparent conductive film.

48. (Original) A device according to claim 45 wherein said inorganic material comprises silicon oxide.

49. (Original) A device according to claim 45 wherein said channel region comprises a material selected from the group consisting of silicon, germanium and a combination thereof.

50. (Original) A device according to claim 45 wherein said gate insulating film is 500Å to 2000Å thick.

51. (Currently Amended) A device according to claim 45 wherein said ~~interlayer~~ insulating film is 0.2 to 0.6 μm thick.

52. (Original) A device according to claim 45 consisting of 640 x 480 pixels arranged in a matrix form.

53. (Original) A device according to claim 45 consisting of 1260 x 960 pixels arranged in a matrix form.

54. (Previously Presented) A device according to claim 45 wherein said semiconductor layer has an electron mobility of 15 to 300cm²/Vsec.

55. (Previously Presented) A device according to claim 45 wherein said semiconductor layer has a hole mobility of 10 to 200 cm²/Vsec.

56. (Currently Amended) A device according to claim 45 further comprising a conductive film formed on said ~~interlayer~~ insulating film and electrically connected to said thin film transistor through a contact hole formed in said ~~interlayer~~ insulating film.

57. (Original) A device according to claim 56 wherein said pixel electrode is connected to said thin film transistor via said conductive film.

58. (Original) A device according to claim 1, wherein said organic resin film comprises polyimide.

59. (Original) A device according to claim 10, wherein said organic resin film comprises polyimide.

60. (Original) A device according to claim 19, wherein said organic resin film comprises polyimide.

61. (Original) A device according to claim 32, wherein said organic resin film comprises polyimide.

62. (Original) A device according to claim 45, wherein said organic resin film comprises polyimide.

63. (Original) A device according to claim 1, wherein said channel region comprises boron at concentration in a range of 1×10^{15} - $1 \times 10^{18} \text{ cm}^{-3}$.

64. (Original) A device according to claim 10, wherein said channel region comprises boron at concentration in a range of 1×10^{15} - $1 \times 10^{18} \text{ cm}^{-3}$.

65. (Original) A device according to claim 19, wherein said channel region comprises boron at concentration in a range of 1×10^{15} - $1 \times 10^{18} \text{ cm}^{-3}$.

66. (Original) A device according to claim 32, wherein said channel region comprises boron at concentration in a range of 1×10^{15} - $1 \times 10^{18} \text{ cm}^{-3}$.

67. (Original) A device according to claim 45, wherein said channel region of each of the n-channel and p-channel thin film transistors comprises boron at concentration in a range of 1×10^{15} - $1 \times 10^{18} \text{ cm}^{-3}$.

68. (Currently Amended) An active matrix liquid crystal display device comprising:

a substrate ~~having an insulating surface~~;

an underlying insulating film formed on said substrate;

a pixel circuit and a driving circuit formed ~~over the first substrate~~ on said underlying insulating film;

at least one thin film transistor formed in said pixel circuit, said thin film transistor comprising:

a semiconductor layer having source, drain and channel regions;

an insulating film comprising an inorganic material formed on said thin film transistor;

an organic resin film provided over said insulating film; and

a pixel electrode provided over said organic resin film and connected to said thin film transistor through an opening provided in said organic resin film;

wherein said semiconductor layer exhibits a peak of Raman spectra, displaced from 522 cm^{-1} to the lower frequency direction, and

wherein said ~~semiconductor layer has a semi-amorphous structure in which Si-Si bonds anchor clusters~~ underlying insulating film contains halogen.

69. (Previously Presented) A device according to claim 68 wherein said pixel electrode is a transparent conductive film.

70. (Currently Amended) A device according to claim 68 wherein said ~~inorganic~~ material comprises silicon oxide.

71. (Previously Presented) A device according to claim 68 wherein said channel region comprises a material selected from the group consisting of silicon, germanium and a combination thereof.

72. (Currently Amended) A device according to claim 68 wherein said ~~interlayer~~ insulating film is 0.2 to 0.6 μm thick.

73. (Previously Presented) A device according to claim 68 consisting of 640 x 480 pixels arranged in a matrix form.

74. (Previously Presented) A device according to claim 68 consisting of 1260 x 960 pixels arranged in a matrix form.

75. (Previously Presented) A device according to claim 68, wherein said organic resin film comprises polyimide.

76. (Previously Presented) A device according to claim 68, wherein said channel region comprises boron at concentration in a range of 1×10^{15} - $1 \times 10^{18} \text{ cm}^{-3}$.

77. (Previously Presented) A semiconductor device according to claim 1, wherein said semiconductor layer has an electron mobility of 15 to $300 \text{ cm}^2/\text{Vsec}$.

78. (Previously Presented) A semiconductor device according to claim 1, wherein said semiconductor layer has a hole mobility of 10 to $200 \text{ cm}^2/\text{Vsec}$.

79. (Previously Presented) A semiconductor device according to claim 10, wherein said semiconductor layer has an electron mobility of 15 to $300 \text{ cm}^2/\text{Vsec}$.

80. (Previously Presented) A semiconductor device according to claim 10, wherein said semiconductor layer has a hole mobility of 10 to $200 \text{ cm}^2/\text{Vsec}$.